FRYKA Kältetechnik

Laboratory Coolers and Freezers

Serial Products and Custom-Made

Operating Instructions

Cold Box B35-50

V070503

FRYKA Kältetechnik GmbH		
Ohmstr. 4	Tel.	0049-711-310599-0
73730 Esslingen	Fax	0049-711-310599-29

Internet: www.fryka.de E-Mail: info@fryka.de

Operating Instructions

Cold Box B 35-50

Erection

Erect the appliance the way that the very best aeration is assured viz. At least 30 cm shall remain free at the right and the left side. Avoid locations exposed to excessive heat (max. +28°C) or direct sun rays, because this would lead to failures of the appliance.
The cold box is only for using in dry rooms and needs a flat ground.
Before starting the cooling machine, the cold box should be still at his place min. about 12 hours.

Technical design

The housing consists of stainless steel 4301. The isolated doors is out of hard-foam and has 35 liters capacity. The isolation of the chamber is a combination of isolation-foam and vacuum-isolation-panels. So it is not allowed to drill holes in the isolation, cause this leads to a defect vacuum-isolation.

The cold box has the following outside dimensions: wide 585 mm, depth 765 mm, high 540 mm.
The chamber ist out of stainless steel 4301 and has a volume of 35 liters. The dimensions inside are:
W = 425 mm, D = 300 mm, H = 285 mm.

The refrigerating system at the rear side consists of a refrigerating unit with fully hermetic compressors. There are one axial fan to cool the refrigerating unit. For regulation, there is an electronic on-off regulator with digital display of the actual value and set-point adjuster. For further details please refer to the technical plans.

Starting

Insert mains plug in a 230 volts/50 Hz socket with protection ground. Please take care on the allowed power supply with 220 – 240 V / 50 Hz, cause if the differences are too high this leads to problems with the machine.

Please check the chamber inside, this must be empty until the temperature cools down to the SET-temp.

Switch on the cooling at the standby-switch (left side of the panel) and adjust the working temperature wanted by means of the set-point adjuster-buttons (UP and DOWN under the small blue SET display). All buttons must be pressed for 2 seconds. This should prevent an unintentionally wrong command.

Operating range -10°C to -50°C.

The refrigerating machine starts cooling and the temperature prevailing inside is displayed in the great blue display. Let the machine runs about 4 hours and when the temperature reach the SET-point, you can put in the goods in the chamber.

The alarm at the right side of the panel is switched ON automatically with the standby of the cooling machine. It is activated automatically after 3 hours or when the temp. reaches a difference of +5 K higher the SET-temp.

Temperature Controlling

The controlling of the cooling machine is made from the electronical Board ST100. The panel of the ST100 has 3 different displays (see script at next sides).

The controller works with 3 temp.-sensors. One PT100 sensor for measuring the inside-temp., the second sensor for measuring the temp for the alarm-unit and the third sensor for controlling the heat of the compressor.

The control precision is +/- 1 K.

Function of cooling machine

The machine consists of a one-stage cascade-system. The compressor cools the cools directly the chamber.
The compressor starts some seconds behind swicth ON the standby-switch.
The compressor were switched ON / OFF by the controller for regulate the temperature.

Safety equipment

The refrigerating units are equipped with internal thermal protection to switch off the machines in the case of excessive heat. The units may be switched on again after cooling of the compressors (approx. 1 hour). The reason for the overheating should be checked (most times to high ambient temp. or dusty condenser).

Service connections

On the left side there is are service connections. The upper socket is a RS485 for changing the SET-point. The 3 sockets (black-red-black) are a potential-free alarm contact for connection of an external alarmer. The lower socket is a 10mV/K output for connection of a suitable temperature recorder. The signal means 0V = +0°C and -1V = -100°C.

Alarm Unit

The alarm unit at the right side of control panel has some different alarmfunctions.
Please see therefore the table „Status- and Error Messages“ on the next page.
The alarm unit is completly galvanized separated from the controller and this leads to a very high standard of safety. The alarm is always in function, also when the controller has broken.

The alarm is switched ON automatically with the standby of the cooling machine. It is activated automatically after 3 hours or when the temp. reaches a difference of +5 K higher the SET-temp.
Is the alarm in normal function and there is no actual alarm, the is a small red point in the display.

The alarm can only be switched off when the standby-switch of the cooling is off. This should prevent a unintentionally wrong command.

The following buttons are on the alarm:
„tone off“ = With this you can switch off the acoustic signal for 15 min. If the error is always actual, the signal comes back after the 15 min.
„reset“ = With this button you can reset a alarm signal, when there is no actual alarm.
„alarm off“ = This is the off-switch for the alarm unit. To switch of the alarm is only possible when the cooling machine is switched off.

The alarm unit has the following red LED's:
„....." (display) = At normal function is there a small red point. During a temperature error it displays the highest value of the chamber temperature. So th euser is informed about the highest temperature during the error and can decide if the goods are defect or not.
At other errors the display shows the error code (see in the table the discription of the codes).
„temperature alarm" = Is on when there is a temperature alarm (see table).
„error" = Is on at different errors (see table).
„power failure" = Is on when the battery is defect or when the power failed.

When the alarm is on and is being in normal function (small red point) the alarm unit can make a self-test. With this you can test if the alarm is OK. After pushing the „tone off" button the alarm starts with the self-test (needs 10 sec.) Is after the self-test F8 in the display, there is something wrong with the alarm unit. Is all right, it comes back automatically to the normal display (small red point).

The following teperature alarms can be registrated:
„temperaturealarm cooling" = This error comes from the temp. controller (blue display) to the alarm when the actual temp. (big blue display) is more than +5 or -10 K different from the SET-temp. (small blue display). This alarm is not possible during the cooling down time after switch on by standby.
„temperaturealarm alarm-unit" = This error comes from the alarm-unit when the temperature is out of the range -5°C to -60°C. This alarm is activated after a time difference (at cooling down) or when the value of the display is reaching the range.

In the alarm is a battery installed which guaranteed the power supply for the alarm unit about 72 hours when the power supply for the Cold Box is missing.

Attendance

All parts of the refrigerating machine are suitable for continuous operation. There is not required any attendance. The cooling-air condenser only should be checked at regular intervals depending on the pollution of location (usually once a year).
Please check this item first if the system fails operating. A dirty air condensor might cause the system to overheat and fail.
For cleaning the air-condenser you can put away the right back bars and blow through the black condenser with pressed air.

A dusty air-condenser can lead to a overheating of the cooling machine !

Trouble/repair work

Experts having discussed matters with the manufacturer or the manufacturer`s authorized staff only may repair the refrigerating circuit of the system or intervene therein. Any reliability or warranty will cease in the case of an infringement.

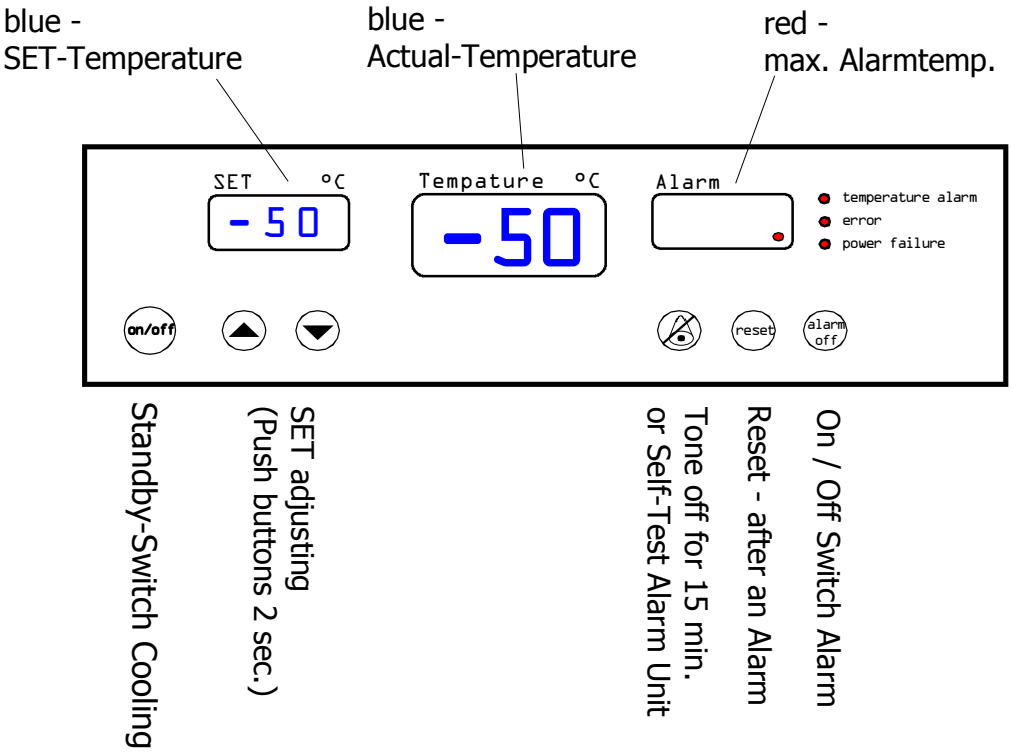
Accessories / special equipment

For the chamber of the cold box are different storage systems and a temperature recorder avaiable.
Further details are available from your dealer or from the manufacturer.

Status- and Error Messages

Display 1 Set °C	Display 2 Temp. °C	Display 3 Alarm	Acoustic	LED 1 temp. alarm	LED 2 error	LED 3 power failure	Description
SET-temp	Actual temp.	Red point					Normal function
	OFF						Cooling is switched off
		OFF					Alarm is switched off
---							SET temp adjusting is locked
	Value flashs	Max Temp	1:3 Sek	Is ON			Temperaturealarm cooling
		Max Temp	1:3 Sek	Is ON			Temperaturealarm alarm-unit
	F1		1:3 Sek		Is ON		Error sensor F1 Controller works like adjusted at Parameter C10
	F2		1:3 Sek		Is ON		Error sensor F2
		F3	1:3 Sek		Is ON		Error sensor F3 Alarm unit is defect
		F4	1x pro Min	Is ON			Range alarm sensor F4
		F4	1:3 Sek		Is ON		Error sensor F4
		F5	1:3 Sek		Is ON		Error sensor F5
		F6	1:3 Sek			Is ON	Battery defect
Out	Out	Max Temp	1:3 Sek			flashing	Power failed, battery is on
	F7		1:3 Sek		Is ON		Door is open
		F8					Seft-Test is not OK
	EP		1:3 Sek		leuchtet		Defect Controller
		EP	1:3 Sek		leuchtet		Defect Alarm Unit

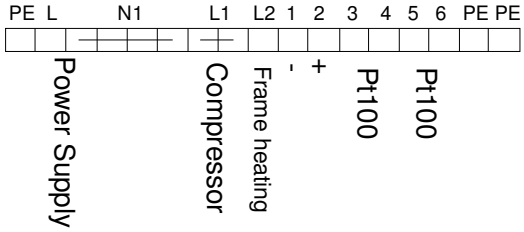
Control Panel ST100 at Cold Box B 35-50



All buttons must be pushed for 2 seconds !

Parts List (Electric)

Terminal:



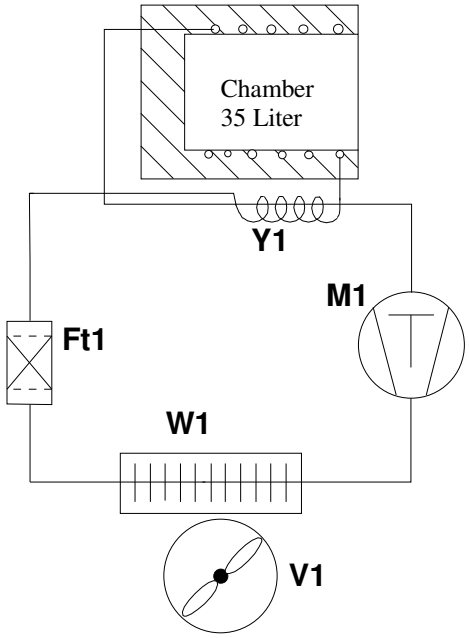
Voltage: 230 V / 50 Hz

Current: 5,0 A

Qu.	No..	Description		
		Main Board	ST100	
		Control Panel	ST100	
	K 1	Compressor	SC 12 CLX	
		Condenser Fan Stage 1	GT 5 200 sg.	
	F 1	Temperature Sensor Controller	PT 100-J	
	F 3	Temperature Sensor Alarm Unit	PT 100-J	
	F 4	Temperature Sensor Overheating	PT 100-1m	
	K 5	Frame Heating	FST 10	

Version: 070503		**B 35-50** Temperature Range -10 / -50°C

Refrigeration Diagram



Refrigerant:	**Stage 1:** R 507-x 160 gr.	
Oil:		

Parts List

	M 1	Compressor Stage 1	CS 12 CLX	
	W 1	Condener Stage 1	FCE 14.1.210	
	V 1	Fan Motor Stage 1	GT 5 200 sg.	
	Ft 1	Filter Dryer Stage 1	15-6-2	
	Y 1	Capillary Stage 1	2x1x3000	
Qu.	**No.**	**Discription**		